Claims

[1]   An image compression system comprising:

an image segmentation unit for segmenting an image into a plurality of sub-images;

a first encoding unit for encoding the sub-images to output sub-image bitstreams;

a BMAP (bitstream map) construction unit for calculating the quantity of information on each sub-image bitstream and generating BMAP information using the calculated quantity of information and information on construction of each sub-image; and

a bitstream combining unit for combining the sub-image bitstreams and the BMAP information.

[2]   The image compression system as claimed in claim 1, further comprising a binarization unit for binarizing the BMAP information generated by the BMAP construction unit and outputting the binarized BMAP information to the bitstream combining unit, the bitstream combining unit combining the sub-image bitstreams and the binarized BMAP information.

[3]   The image compression system as claimed in claim 2, wherein the binarization unit encodes the binarized BMAP information and outputs it.

[4]   The image compression system as claimed in claim 2, wherein the binarization unit allocates a predetermined number of bits to the BMAP information and outputs binary numbers corresponding to the BMAP information.

[5]   The image compression system as claimed in claim 2, wherein the binarization unit carries out a unary arithmetic operation for the BMAP information.

[6]   The image compression system as claimed in claim 2, wherein the binarization unit differential-pulse-code-modulates the BMAP information and binarizes the differential pulse code modulation result.

[7]   The image compression system as claimed in claim 1, wherein the bitstream combining unit combines the BMAP information with the head of the sub-image bitstreams.

[8]   The image compression system as claimed in claim 1, wherein the first encoding unit encodes the sub-images based on JPEG.

[9]   An image compression system comprising:

a first encoding unit for encoding a base-layer image and outputting it as a first bitstream;

an image segmentation unit for segmenting an enhancement-layer image into a plurality of sub-images, and outputting them;

a second encoding unit for encoding the sub-images output by the image segmentation unit, and outputting them as a second bitstream;

a BMAP (bitstream map) construction unit for calculating an information amount of the second bitstream, using the information amount and configuration information of the sub-images, and generating BMAP information; and

a bitstream combining unit for combining the second bitstream and the BMAP information, and outputting combined data.

[10]   The image compression system as claimed in claim 9, further comprising:

a down sampling unit for down sampling the input image and outputting the down sampled image as the base-layer image;

an up sampling unit for up sampling the image generated by decoding the first bitstream, and outputting the up sampled image; and

a summing unit for outputting a difference between the input image and the image output by the up sampling unit to the enhancement layer image.

[11]   The image compression system as claimed in claim 9, wherein the second encoder performs interframe encoding.

[12]   An image decoding system comprising:

a bitstream receiving unit for receiving bitstreams of an image including a plurality of sub-images;

a BMAP reading unit for reading BMAP information included in the bitstreams and outputting information on a sub-image to be decoded among the plurality of sub-images;

a sub-image extracting unit for extracting a bitstream corresponding to the sub-image to be decoded from the bitstreams using the information on the sub-image to be decoded; and

a sub-image decoding unit for decoding the bitstream extracted by the sub-image extracting unit.

[13]   The image decoding system as claimed in claim 12, wherein the BMAP information includes information on construction of each sub-image and the quantity of information of each sub-image bitstream.

[14]   The image decoding system as claimed in claim 12, further comprising an interface unit for providing interface through which a user selects a region to be decoded from the first image.

[15]   The image decoding system as claimed in claim 12, wherein the information on the sub-image represents the position in the bitstreams of the first image, which includes the bitstream of the sub-image to be decoded.

[16]   An image decoding system comprising:

a first decoding unit for decoding a bitstream of a base-layer image, and outputting it;

a BMAP reading unit for reading BMAP information included in the bitstream of an enhancement image including a plurality of sub-images, and outputting information of a sub-image to be decoded from among the sub-images;

a sub-image extracting unit for using information on the sub-image to be decoded, and extracting a bitstream which corresponds to the sub-image to be decoded; and

a second decoding unit for decoding the bitstream extracted by the sub-image extracting unit, and outputting the decoded bitstream.

[17]   The image decoding system as claimed in claim 16, further comprising an up-sampling unit for up-sampling the output image of the first decoding unit, and a summing unit for summing up the image output from the up-sampling unit and the image output from the second decoding unit.

[18]   The image decoding system as claimed in claim 16, wherein the second decoding unit carries out interframe decoding.

[19]   An image compressing method comprising:

(a) segmenting the first image into a plurality of sub-images;

(b) encoding the sub-images to generate sub-image bitstreams;

(c) calculating the quantity of information of each sub-image and generating BMAP information using the calculated quantity of information and information on construction of each sub-image;

(d) combining the sub-image bitstreams and the BMAP information to generate frame bitstreams; and

(e) combining the frame bitstreams to form the bitstream of the input image.

[20]   The image compression method as claimed in claim 19, wherein encoding the sub-images to generate sub-image bitstreams comprises:

discrete-cosine-transforming the sub-images;

quantizing the discrete-cosine-transformed data; and

entropy-coding the quantized data.

[21]   The image compression method as claimed in claim 19, wherein combining the

sub-image bitstreams and the BMAP information to generate frame bitstreams comprises binarizing the BMAP information and combining the binarized BMAP information and the sub-image bitstreams.

[22]   An image compression method comprising:

(a) encoding a base-layer image and outputting it as a first bitstream;

(b) segmenting an enhancement image into a plurality of sub-images;

(c) encoding the sub-images and outputting them as a second bitstream;

(d) calculating an information amount of the second bitstream, using the information amount and configuration information of the sub-image, and generating BMAP information;

(e) combining the bitstream of the sub-images and the BMAP information to generate frame bitstreams; and

(f) combining the frame bitstreams, and outputting combined data.

[23]   The image compression method as claimed in claim 22, further comprising, before (a), down sampling the input image to generate the base-layer image.

[24]   The image compression method as claimed in claim 23, further comprising, after (a), outputting a difference between the input image after (a) and the up sampled image generated by decoding the first bitstream to the enhancement image.

[25]   An image decoding method comprising:

receiving bitstreams of an image including a plurality of sub-images;

reading information on a sub-image corresponding to a region to be decoded among the plurality of sub-images using BMAP information included in the bitstreams; and

extracting a bitstream corresponding to the sub-image to be decoded from the bitstreams.

[26]   The image decoding method as claimed in claim 25, wherein the BMAP information includes information on construction of each sub-image and the quantity of information of each sub-image bitstream.

[27]   An image decoding method comprising:

decoding a bitstream of a base-layer image, and outputting the decoded bistream;

using BMAP information included in a bitstream of an enhancement layer including a plurality of sub-images, and reading information on a sub-image corresponding to a region to be decoded from among the sub-images;

using information on the sub-image to be decoded, and extracting a bitstream corresponding to the sub-image to be decoded from among the enhancement

layer image; and

decoding the extracted bitstream, and outputting the decoded bitstream.

[28]   A recording medium storing an image compression program, comprising:

receiving an image including at least one frame;

segmenting the image into a plurality of sub-images;

encoding the sub-images to generate sub-image bitstreams;

calculating the quantity of information of each sub-image bitstream and generating BMAP information using the calculated quantity of information and information on construction of each sub-image; and

combining the sub-image bitstreams and BMAP information to generate frame bitstreams.

[29]   The recording medium as claimed in claim 28, further comprising combining the frame bitstreams to form the bitstream of the image when the image includes multiple frames.

[30]   A recording medium storing an image decoding program, comprising:

receiving bitstreams including a plurality of sub-images;

reading information on a sub-image including a region to be decoded among the plurality of sub-images using BMAP information included in the bitstreams; and

extracting a bitstream corresponding to the sub-image to be decoded from the bitstreams.

[31]   The recording medium as claimed in claim 30, wherein the BMAP information includes information on construction of each sub-image and the quantity of information of each sub-image bitstream.